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# A new *Rhyparus* Westwood, 1845 (Coleoptera: Scarabaeidae: Aphodiinae) species with modified pygidium and last abdominal ventrite in females

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| | |
|---|---|
| Coleoptera; | taxonomy; |
| Scarabaeidae; | new species; |
| Aphodiinae ; | description; |
| *Rhyparus*; | Sulawesi. |

**Abstract**. – A new species of the genus *Rhyparus* Westwood, 1845 is described and illustrated: *Rhyparus sulawesiensis* **sp**. **nov**. from Sulawesi Island. The newly described species belongs to the group of species with modified pygidium and last abdominal ventrite in females.

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## Introduction

Genus *Rhyparus* Westwood, 1845 is a wide-spread group of scarab beetles (Scarabaeidae: Aphodiinae), 69 species and one subspecies are distributed in the Australian and the Oriental Regions (e.g., Mencl et al. 2013; Minkina 2017, 2019; Masumoto & Ochi, 2018; Ochi et al. 2018a, b, 2019a, b, 2021; Masumoto et al. 2019; Minkina & Anichtchenko 2022; Minkina & Král 2022; Minkina et. al. 2022). The females of the group under discussion are easily distinguished, but the males are very often difficult to identify. This is especially true when the species do not have any unique features. *R. sulawesiensis* **sp**. **nov**. is one of those species that lack unique features in males. Some features that help identify *R. sulawesiensis* **sp**. **nov**. are listed in Tables 1 and 2 in Minkina et al. (2022). The endemism of the species in the group in question is somewhat helpful. Nevertheless, we decided to provide a key to the species of this group, which we present below.

Despite the many species described in the last ten years (28 species in total), there is no modern revision and infrageneric classification. The only group of species formally proposed is that of Stebnicka (1998) and Minkina et al. (2022), who established a group with distinctly modified pygidium and/or at least the last abdominal ventrite in females. The males and females belonging to this group differ from all other *Rhyparus* by a combination of following characters: species large or medium-sized (about 5.3-8.2 mm), body distinctly elongate, lateral lobes of the pronotum low or very low, punctation of the basal half of the pronotum always more or less dense, caudal bulbs always reduced without sinuation between the external bulbs and the sides of the elytra and without sinuation between the external and medio-internal bulbs. Females are always very easily distinguishable from all other *Rhyparus* species by their modified abdomen. Identification of males is not so easy and requires much more attention.

Currently, the group includes eight species (Minkina et al. 2022): *Rhyparus approximans* Fairmaire, 1893 (Borneo Island), *R. loebli* Paulian, 1983 (Taiwan and Japan), *R. sepikensis* Stebnicka, 1998 (New Guinea), *R. paraphilippinensis* Ochi & Kakizoe, 2021 (Mindanao Island), *R. bacanensis* Minkina, Anichtchenko, Vasiljeva & Skelley, 2022 (Bacan Island), *R. buruensis* Minkina, Anichtchenko, Vasiljeva & Skelley, 2022 (Buru Island), *R. fijiensis* Minkina, Anichtchenko, Vasiljeva & Skelley, 2022 (Viti Levu and Vanua Levu Islands) and *R. stebnickae* Minkina, Anichtchenko, Vasiljeva & Skelley, 2022 (New Guinea).

While examining of specimens from the authors' collections, we found four specimens of an undescribed *Rhyparus* from Sulawesi Island, which belongs to the above mentioned group of species and is described below.

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## Material and methods

The specimens were observed with a Nikon SMZ-U stereoscopic microscope. Photos published here were taken by the use of the Canon EOS 5D Mark III connected with Canon MP-E 65mm macro lens. Photos were edited in the Helicon Focus 7 and Adobe Photoshop Elements 2018 programs.

For morphological terms used in the description of specimens we follow Krikken & Huijbregts (1987).

The type specimens of the new species are indicated by a red, printed label bearing the status of the specimen, sex, its name, name of the authors and year and month of the designation. In manuscript we use „|" to show separate lines from labels and „||" to show separate labels.

The following abbreviations identify depository of specimens examined:

**IECA** - Biology Centre of the Czech Academy of Sciences, Institute of Entomology, České Budějovice, Czech Republic;

**ISEA** - Institute of Systematics and Evolution of Animals Polish Academy of Sciences, Kraków, Poland;

**ŁMCP** - Łukasz Minkina private collection, deposited in the Institute of Systematics and Evolution of Animals Polish Academy of Sciences, Kraków, Poland;

**SJCP** - Stanislav Jákl collection, Prague, Czech Republic.

## Results

**SCARABAEIDAE** Latreille, 1802

**APHODIINAE** Leach, 1815

**RHYPARINI** Schmidt 1910

***Rhyparus*** Westwood, 1845

### *Rhyparus sulawesiensis* sp. nov.

(Fig. 1-5, 7 & 10)

ZooBank: https://zoobank.org/F95F5D84-32B6-4BA1-A0E0-F7BC6F2FF053

**Holotype**, ♀, « Indonesia, C-Sulawesi, Poso, 11-16.iv.1999, 1-400 m., 5-10 km SW Tambarana, Bečvář & Zábranský leg. » (SJCP).

**Paratypes**, 2 ♀ & 1 ♂, same data as for the holotype (1 ♂ & 1 ♀ in ŁMCP; 1 ♀ in IECA).

**Type locality**. – Indonesia, Sulawesi Island, C-Sulawesi, Poso, 5-10 km SW Tambarana.

### *Description of the holotype*

***Dorsum*** (Fig. 1). – Length: 6.8 mm; maximum width: 2.2 mm. Body medium-large sized for members of this genus, elongate, not so distinctly convex, flattened in central part; almost matt; apparently almost glabrous, though partly clothed with very small yellowish macrosetae on head and all longitudinal costae on pronotum and elytra. Brownish to dark brown; antennae, tarsomeres and mouth parts pale brown.

***Head*** (Fig. 4). – Matt, tops of costae distinctly shiny; transversely sub-hexagonal; clypeus trapezoidal in outline, anteriorly truncate, on sides weakly upturned as obtuse, weak tooth, and later sinuous on either side; genae distinctly more excavate than eyes; clypeal disc distinctly convex, ringed by a deep groove; convexity with a pair of indistinct, moderately convex ridges; nearly on whole surface with distinct, fine punctures bearing small macrosetae. Frons with four distinct, longitudinal ridges with similar structure to the ridges on the clypeal convexity. Head covered by fairly regularly spaced, moderately dense, medium sized punctures bearing small macrosetae.

***Pronotum***. – Matt, tops of costae distinctly shiny; with eight distinct costae and seven intercostae, with two lateral, rounded lobes on each side. Anterior lobes somewhat lower and distinctly narrower than posterior, on the top are the widest part of pronotum. Sinuation between anterior and posterior lobe weak. Costae of middle, third and fourth pair not interrupted in basal part apical half, very gently convergent, distinctly convergent in the middle of apical third; second pair of costae distinctly interrupted in basal part of apical half; costae on each side with very small punctures bearing very small macrosetae. All intercostae in anterior part without additional short costae. Median intercostae with dense punctures, quite distinctly concentrated around median part, all intercostae in basal part with distinct, dense punctation.

***Scutellum***. – Almost imperceptible.

***Elytra***. – Matt, tops of costae and preapical glandular area more distinctly shiny. Each elytron with six elevated costae, and five flat intercostae. Costae on sides with very small punctures bearing very small macrosetae. Preapical glandular area relatively small. First to fourth intercostae with two distinct rows of punctures and with one row of quite irregularly spaced, very fine punctures between that two rows; on third intercostae there is a very short additional costa with two very short additional rows of punctures. Fifth intercosta with one row of punctures; in the basal part of the fourth intercosta there is a region with an extremely short additional costa, with some additional punctures. External caudal bulb distinctly reduced, area between external caudal bulb and sides of elytra not divided; external and mediointernal caudal bulbs not divided; mediointernal caudal bulb shortened, visible as transversely rounded bulb.

***Pygidium*** (Fig. 5). – With very sparse, irregularly spaced punctation, with weak longitudinal rib in the middle and deep excisionon on its sides; with apex in the shape of volcano with rounded top.

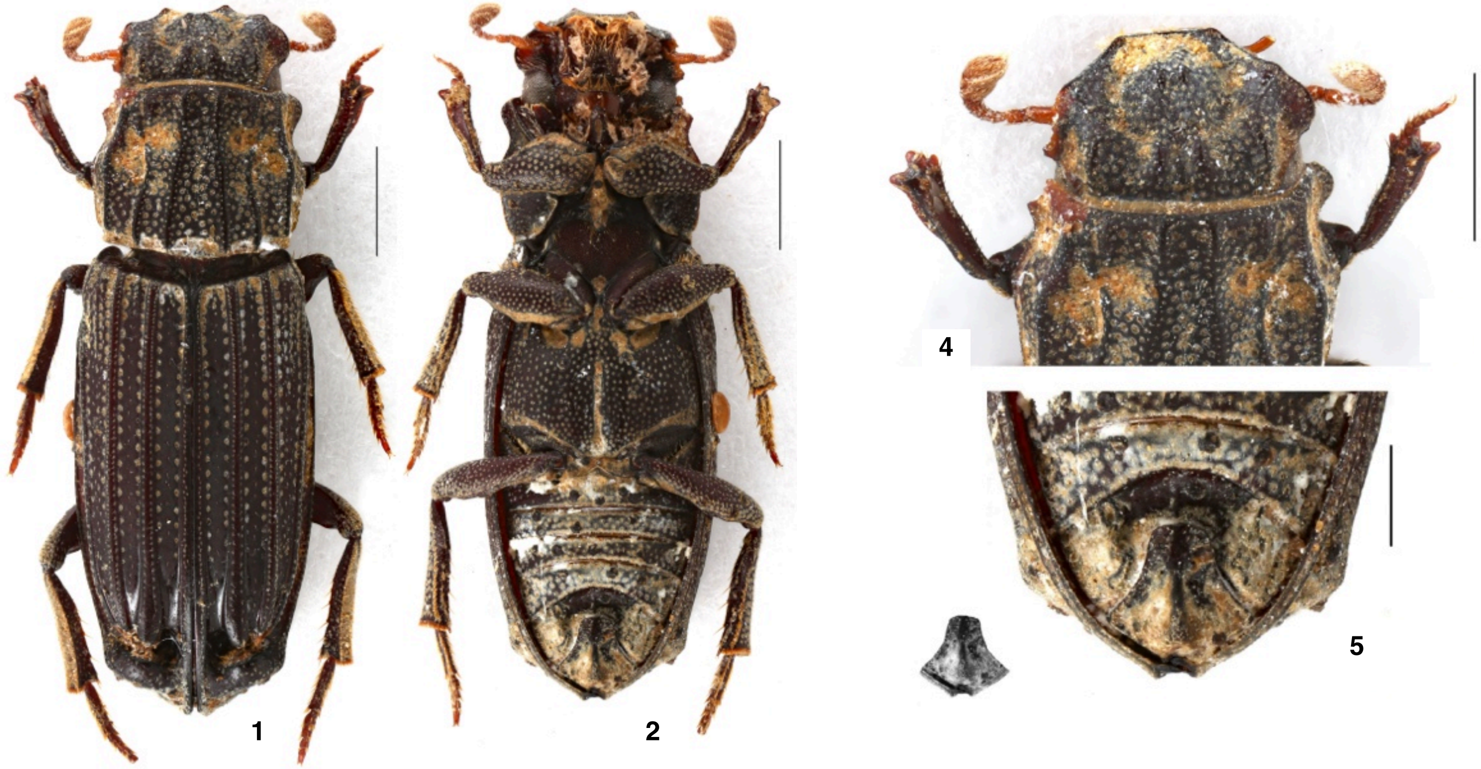
***Venter*** (Fig. 2). – Matt. Meso-metaventral plate flattened in the middle, with distinct, narrow, quite deep longitudinal furrow; punctation of meso-metaventral plate dense, quite regularly spaced, irregular in size; all punctures bearing short macrosetae. Abdominal ventrites matt, on sides with rows of punctures; with an additional punctured furrow in basal part. Last abdominal ventrite with dense punctures, which are about one and half times larger than on last but one ventrite; in basal half in the middle part with very deep cavity that does not take the shape of the rows; in apical part in the middle with very deep groove, clearly located far below apex of pygidium. Meso- and metafemora with one very indistinct tubercle on lower border; all femora shiny, with regular, very distinct, rather small, very dense punctation; all punctures bearing small macrosetae.

***Sexual dimorphism***. – Males differ from females in the following characters: metatibiae more sinuate and bearing large, flattened, inwardly bent apical spine, last abdominal ventrite and pygidium normally developed.

***Variability***. – Body length varies from 6.3 to 6.8 mm. Intercostae are relatively more or less weakly shiny. Punctation of clypeus and pronotum is more or less variable in size, distribution and density. Median row of punctures on third elytral intercosta very weakly variable in length. The aedeagus of the male was not examined due to the very high similarity of the copulatory apparatuses in males and therefore of no value when identifying species of the genus.

***Etymology***. – Toponymic; an adjective derived from the name of Sulawesi Island, where the new species was collected.

***Differential diagnosis***. – Based on the proportions of the body (mostly large species, much less frequently medium-sized species; all species distinctly elongate), the very weakly developed lateral lobes of the pronotum, the distinctly punctate basal half of the pronotum, and the weakly developed caudal bulbs without separation between the individual bulbs, we can classify the males and females of *R. sulawesiensis* **sp. nov**. as members of a group with modified pygidium and last abdominal ventrite in females. The modified abdominal ventrites of the females make them unique and easily distinguishable from all other species known in the world. The shape of the pygidium in the females of *R. sulawesiensis* **sp. nov**. is largely similar to that of *R. sepikensis*. However, it is easily distinguished from the latter by the much denser and thicker body punctures (compare



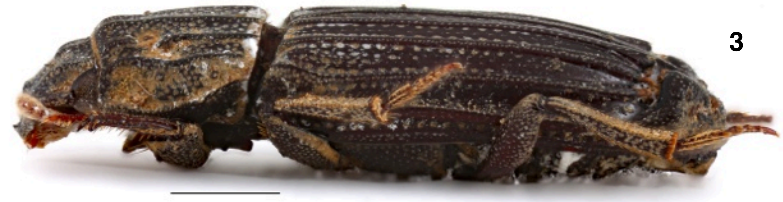


**Fig. 1 - 3**. *Rhyparus sulawesiensis* **sp. nov.**, ♀, holotype.

**1**. Dorsal view. **2**. Ventral view. **3**. Lateral view. **4**. Head. **5**. Pygidium. (scale lines: 1.0 mm)

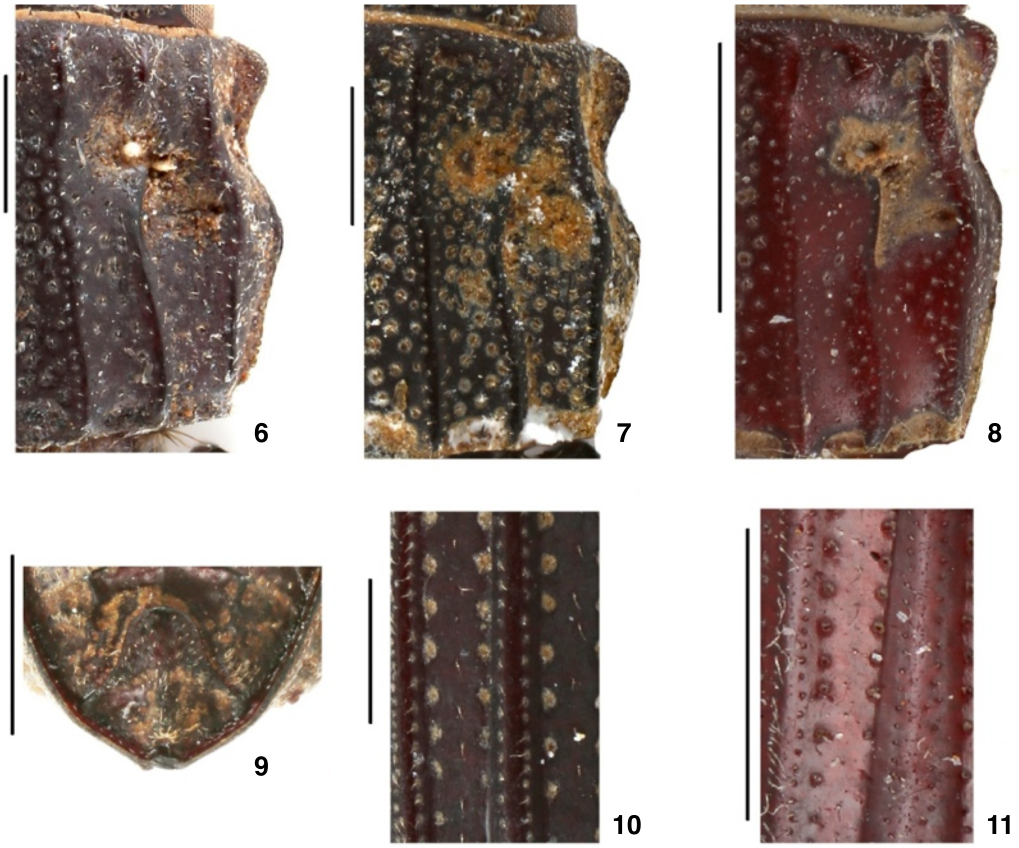


**Fig. 6 - 11**. Morphology details.

**6**. *Rhyparus paraphilippinensis* Ochi & Kakizoe, 2021, ♀, pronotum. **7**. *Rhyparus sulawesiensis* **sp. nov.**, ♀, holotype, pronotum. **8**. *Rhyparus sepikensis* Stebnicka, 1998, ♀, paratype, pronotum. **9**. *Rhyparus paraphilippinensis* Ochi & Kakizoe, 2021, ♀, pygidium. **10**. *Rhyparus sulawesiensis* **sp. nov.**, ♀, holotype, elytral disc. **11**. *Rhyparus sepikensis* Stebnicka, 1998, ♀, paratype, elytral disc. (scale lines: 0.5 mm)

## Key to species of *Rhyparus* with modified pygidium and last abdominal ventrite in females

**1**. Punctures in basal part of lateral pronotal intercostae much smaller - fine. Second pair of elytral costae distinctly widened in apical half. Apex of pygidium of females volcano-shaped with rounded top. Papua New Guinea . . . . . . . . . . . . . . ***sepikensis*** Stebnicka, 1998

— Punctures in basal part of lateral pronotal intercostae always much larger - at least moderately coarse. Second pair of elytral costae distinctly widened only shortly before apex . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . **2**

**2**. Upper side (especially head and pronotum) always covered by yellowish, dusty pattern. Elytral intercostae 1-4 with three distinct rows of punctures. Pygidium of females weakly modified as a member of the group – in the shape of obtuse traingle. Borneo . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***approximans*** Fairmaire, 1893

— Upper side never covered by yellowish, dusty pattern. Elytral intercostae 1-4 with two distinct rows of punctures, in part of species third, median rows observed, but punctures there are always much finer than in median rows . . . . . . . . . . . . . . . . . . . . **3**

**3**. More distinctly shiny: pronotal costae and intercostae always similarly distinctly shiny, elytral costae always distinctly shiny, elytral intercostae usually similarly distinctly shiny, rarely less shiny than elytral costae, very rarely subopaque. Lateral lobes of pronotum weakly developed. Viti Levu Island, Vanua Levu Island, Buru Island . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . **4**

— Less distinctly shiny: pronotal costae from subopaque to distinctly shiny, pronotal intercostae always less distinctly shiny than costae, from matt to subopaque, elytral costae from subopaque to distinctly shiny, elytral intercostae always less distinctly shiny than costae, from matt to moderately shiny. Lateral lobes of pronotum weakly to moderately developed . . . . . . . . . . . . . . . . . . . . . . **5**

**4**. Punctation of basal half of median intercostae of pronotum quite regularly distributed, weakly concentrated along median line. Anterior lobes of pronotum almost triangular. Fourth elytral intercostae is least steep in the group, seems to be distinctly widened before apex. Apex of pygidium of females volcano-shaped with sinuate top. Buru Island . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***buruensis*** Minkina, Anichtchenko, Vasiljeva & Skelley, 2022

— Punctation of basal half of median intercostae of pronotum very distinctly concentrated along median line. Anterior lobes of pronotum rounded. Fourth elytral intercostae is not so steep, seeming to be weakly widened before apex. Apex of pygidium of females volcano-shaped with truncate top. Viti Levu and Vanua Levu Islands . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***fijiensis*** Minkina, Anichtchenko, Vasiljeva & Skelley, 2022

**5**. Posterior lobes of pronotum widely rounded, with moderately distinct sinuation between anterior and posteriori lobes. Posterior lobes of pronotum quite distinctly higher than anterior. Elytral suture before apex always with distinct, elevated protuberance. Apex of pygidium of females mountain-shaped with rounded top. Mindanao Island . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***paraphilippinensis*** Ochi & Kakizoe, 2021

— Posterior lobes of pronotum triangular to widely rounded; when posterior lobes of pronotum widely rounded sinuation between anterior and posterior lobes very weak to weak. Posterior lobes of pronotum the same height as anterior, rarely weakly higher than anterior (only in *R. sulawesiensis* **sp. nov**.). Elytral suture before apex at most with weak protuberance . . . . . . . . . . . . . . . . . **6**

**6**. Lateral lobes of pronotum and sinuation between them very weakly to weakly developed. Punctation of pronotal median intercostae distinctly concentrated along median line . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . **7**

— Lateral lobes of pronotum and sinuation between them weakly to moderately developed. Punctation of pronotal median intercostae irregularly distributed, at most only partialy, not distinctly concentrated along median line . . . . . . . . . . . . . . . . . . . **8**

**7**. Posterior lobes of pronotum widely rounded. Sinuation between anterior and posterior lobes very weak. Basal mesotarsomeres as long as two next combined. Apex of pygidium of females distinctly triangular. Bacan Island . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***bacanensis*** Minkina, Anichtchenko, Vasiljeva & Skelley, 2022

— Posterior lobes of pronotum widely triangular. Sinuation between anterior and posterior lobes weak. Basal mesotarsomeres as long as next three combined. Apex of pygidium of females volcano-shaped with sinuate top. New Guinea . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . ***stebnickae*** Minkina, Anichtchenko, Vasiljeva & Skelley, 2022

**8**. Posterior lobes of pronotum widely rounded. Sinuation between anterior and posterior lobes weak. Clypeus anteriorly truncate. Apex of pygidium of females volcano-shaped with rounded top. Sulawesi Island . . . . . . . . . . . ***sulawesiensis* sp. nov.**

— Posterior lobes of pronotum widely triangular. Sinuation between anterior and posterior lobes moderate. Clypeus anteriorly sinuate. Pygidium of females not modified. Taiwan Island and Japan (Amami Oshima Island) . . . . . . . . . . . ***loebli*** Paulian, 1983

Fig. 7 and 10 with 8 and 11), elytral costae nearly parallel on disc (compare Fig. 10 with 11), the three rows on the elytral intercostae (two with large punctures and the middle one with fine punctures) (compare Fig. 10 with 11), two rows on the elytral costae (compare Fig. 10 with 11), and the somewhat more distinct lateral lobes on the pronotum (compare Fig. 7 with 8). The punctures on the elytral intercostae and the number of rows present there, with a similar body sheen, make it similar to *R. paraphilippinensis*. However, *R. paraphilippinensis* has a different shape of the pygidium in females (with a mountain-shaped apex with a regularly rounded top) (compare Fig. 5 with 9), finer and less dense punctures of pronotal intercostae (compare Fig. 6 with 7), and somewhat more distinctly developed lateral lobes of pronotum (compare Fig. 6 with 7), and also the sinuation between them is somewhat more developed (compare Fig. 6 with 7). Further details and information can be found in the « Discussion » section (see key to species).

### ***Rhyparus paraphilippinensis*** Ochi & Kakizoe, 2021

(Fig. 6 & 9)

**Specimen**, ♀, Philippines, Mindanao, Kalatungan, Bukidnon, ix.2016, local coll (ŁMCP).

### ***Rhyparus sepikensis*** Stebnicka, 1998

(Fig. 8 & 11)

**Paratype**, ♀, New Guinea: NE. | Torricello Mts. | Mokai vill. 750 m. | 1-23.i.1959 ||W.W. Brandt | collector | Bishop || (ISEA).

## Discussion

The females of the group under discussion are easily distinguished, but the males are very often difficult to identify. This is especially true when the species do not have any unique features. *R. sulawesiensis* **sp**. **nov**. is one of those species that lack unique features in males. Some features that help identify *R. sulawesiensis* **sp**. **nov**. are listed in Tables 1 and 2 in Minkina et al. (2022). The endemism of the species in the group in question is somewhat helpful. Nevertheless, we decided to provide a key to the species of this group, which we present below.

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### ***Authors contribution*** [1]

*Publisher correspondence*. – ML
*Writing the article.* – ML, JS & BA
*Description of the new species.* – ML, JS & BA
*Article proofreading.* – ML, JS & BA
*Bibliographic work.* – ML & BA
*Material study.* – ML, JS & BA
*Author of the figures.* – ML

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(1) **ML** = Minkina Ł. – **JS** = Jákl S. – **BA** = Bezděk A.

## Résumé

Minkina Ł., Jákl S. & Bezděk A., 2023. – Une nouvelle espèce du genre *Rhyparus* Westwood, 1845 (Coleoptera : Scarabaeidae : Aphodiinae) au pygidium et au dernier ventrite abdominal modifiés chez les femelles. *Faunitaxys*, 11(66): 1 – 5.

Une nouvelle espèce du genre *Rhyparus* Westwood, 1845 est décrite et illustrée : *Rhyparus sulawesiensis* **sp**. **nov**. de l'île de Sulawesi. Elle appartient à un groupe au pygidium et au dernier ventrite abdominal modifiés chez les femelles.

Mots-clés. – Coleoptera, Scarabaeidae, Aphodiinae, *Rhyparus*, taxonomie, espèce nouvelle, description, Sulawesi.

# Faunitaxys

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## SOMMAIRE

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***Illustration de la couverture*** :

*Rhyparus sulawesiensis* **sp**. **nov**., ♀, holotype.

Crédit:
**Łukasz Minkina** : Fig. 1-11.

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